

LIGNICOAT EU Project

Sustainable coatings based on lignin resins and bio-additives with improved fire, corrosion and biological resistance

Lignin-based clear biocoatings for fire wood protection

Dr. Claudio Pagella – IRIS COATINGS (Italy)



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This project has received funding from the Bio-based Industries Joint Undertaking (JU) under the European Union's Horizon 2020 research and innovation programme under grant agreement No 101023342. The JU receives support from the European Union's Horizon 2020 research and innovation programme and the Bio-based Industries Consortium.



About the speaker

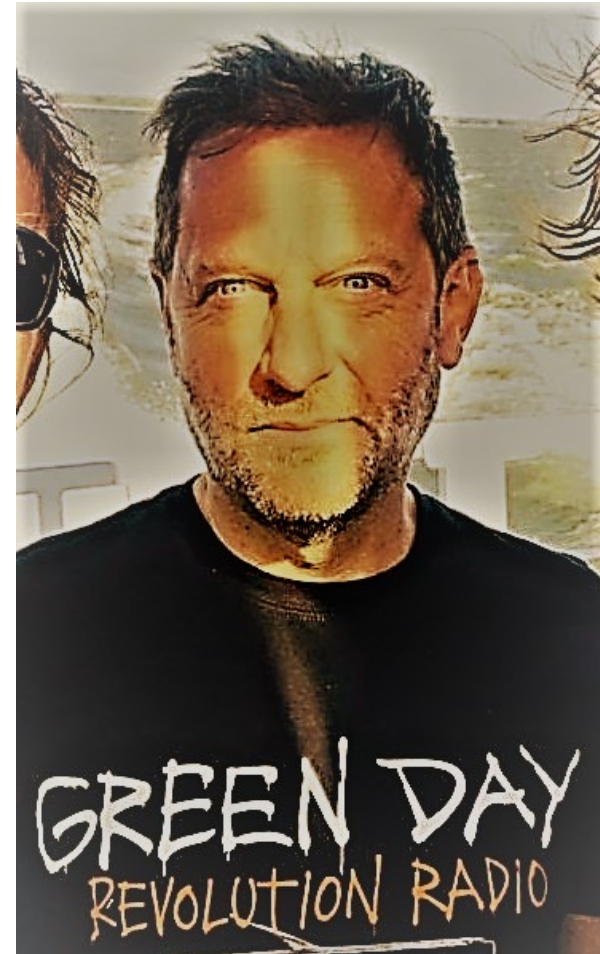
Claudio Pagella

Chemical engineer PhD

Former researcher & contract professor

Since 30 years in intumescent coatings

Now CEO at The logo for IRIS COATINGS, with "IRIS" in a colorful, stylized font and "COATINGS" in a black, sans-serif font below it.



The coatings industry challenge



The environmental impact of **fossil-based coatings** and volatile organic compounds (**VOCs**) emissions raised concerns, and regulations were implemented to diminish their use in coatings

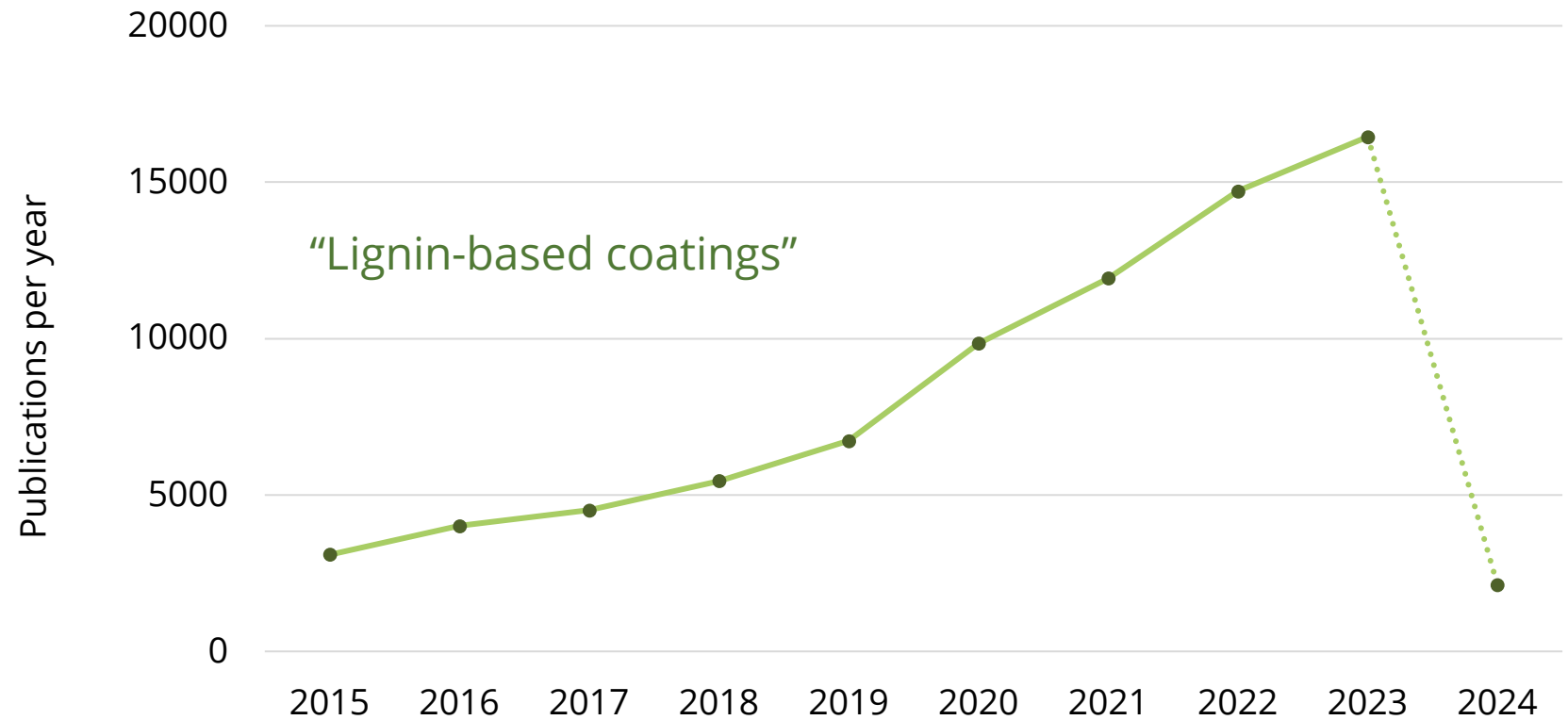


Why lignin

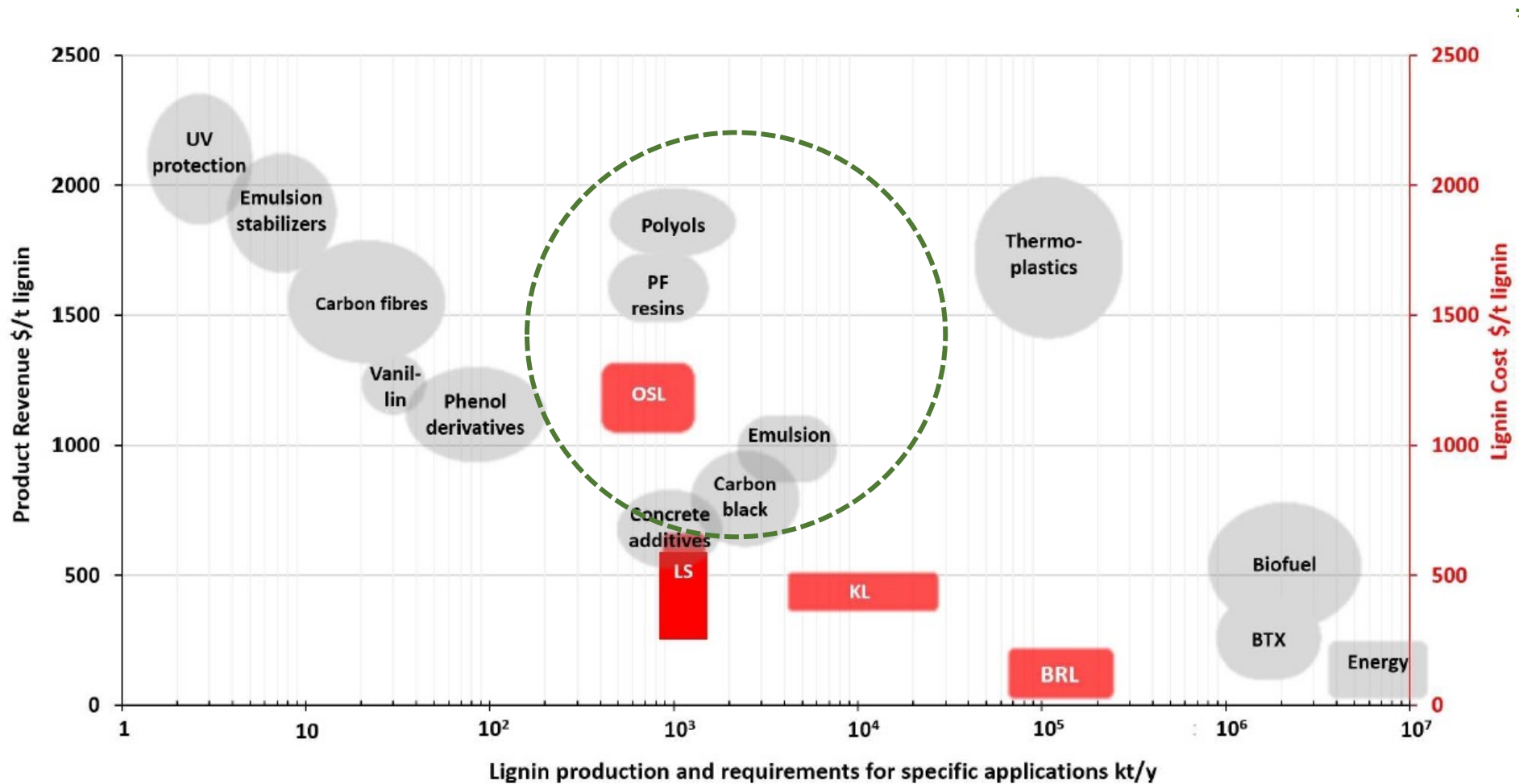


Lignin is one of the most abundant **organic polymers** on Earth and the most abundant natural source of **aromatic compounds**

and raising growing interest in the **coatings industry**



Lignin market and applications



Lignin biomass as feedstock



LIGNICOAT aims to demonstrate the technical and economic feasibility of the use of **lignin as raw material** to produce **bio-resins** for **3 coating specialties**

- Wood fireproofing coatings
- Metal anticorrosion coatings
- Antimicrobial hygienic coatings

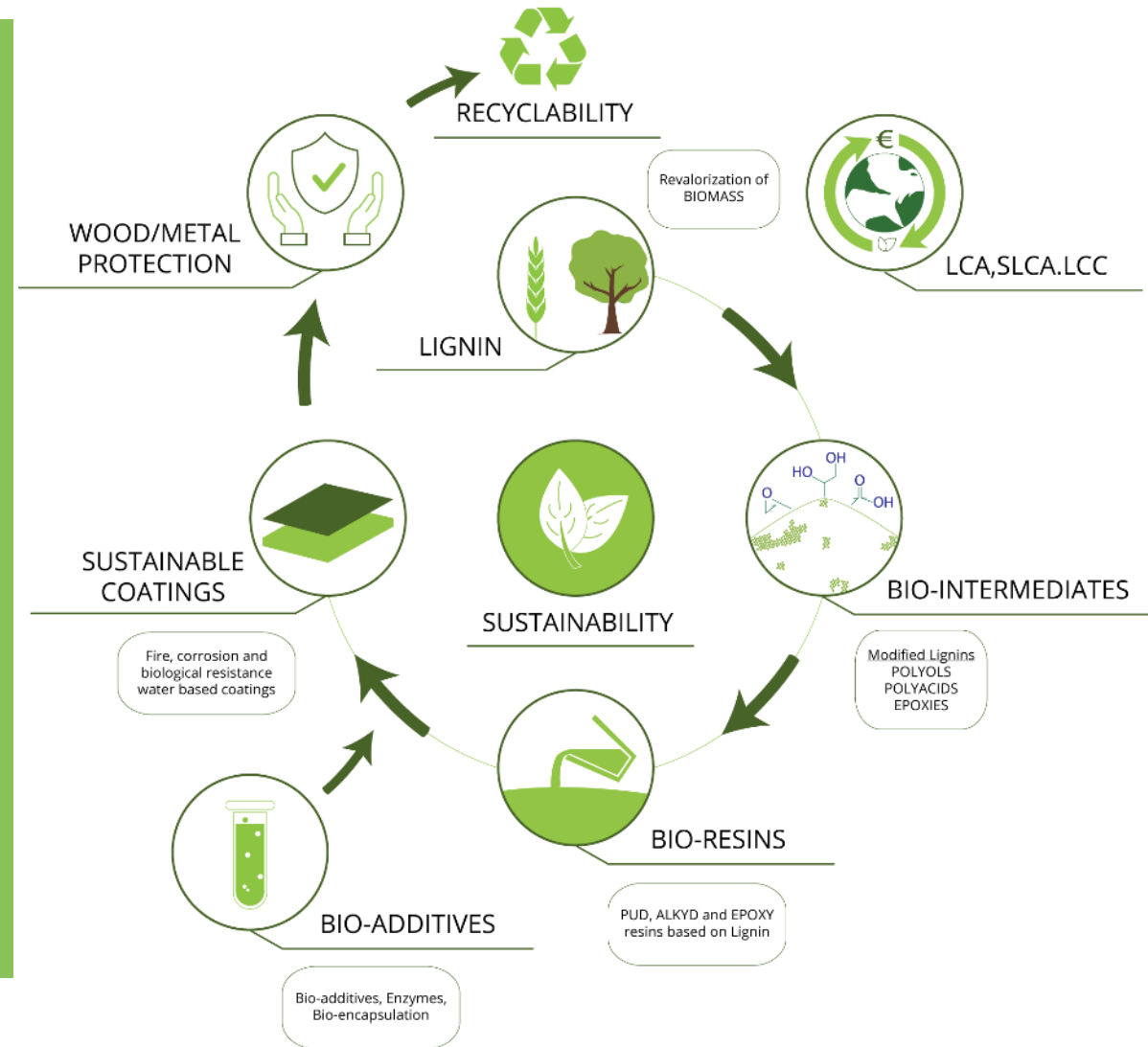


LIGNICOAT's sustainable solution



Key to LIGNICOAT's solutions is the use of **lignin**.

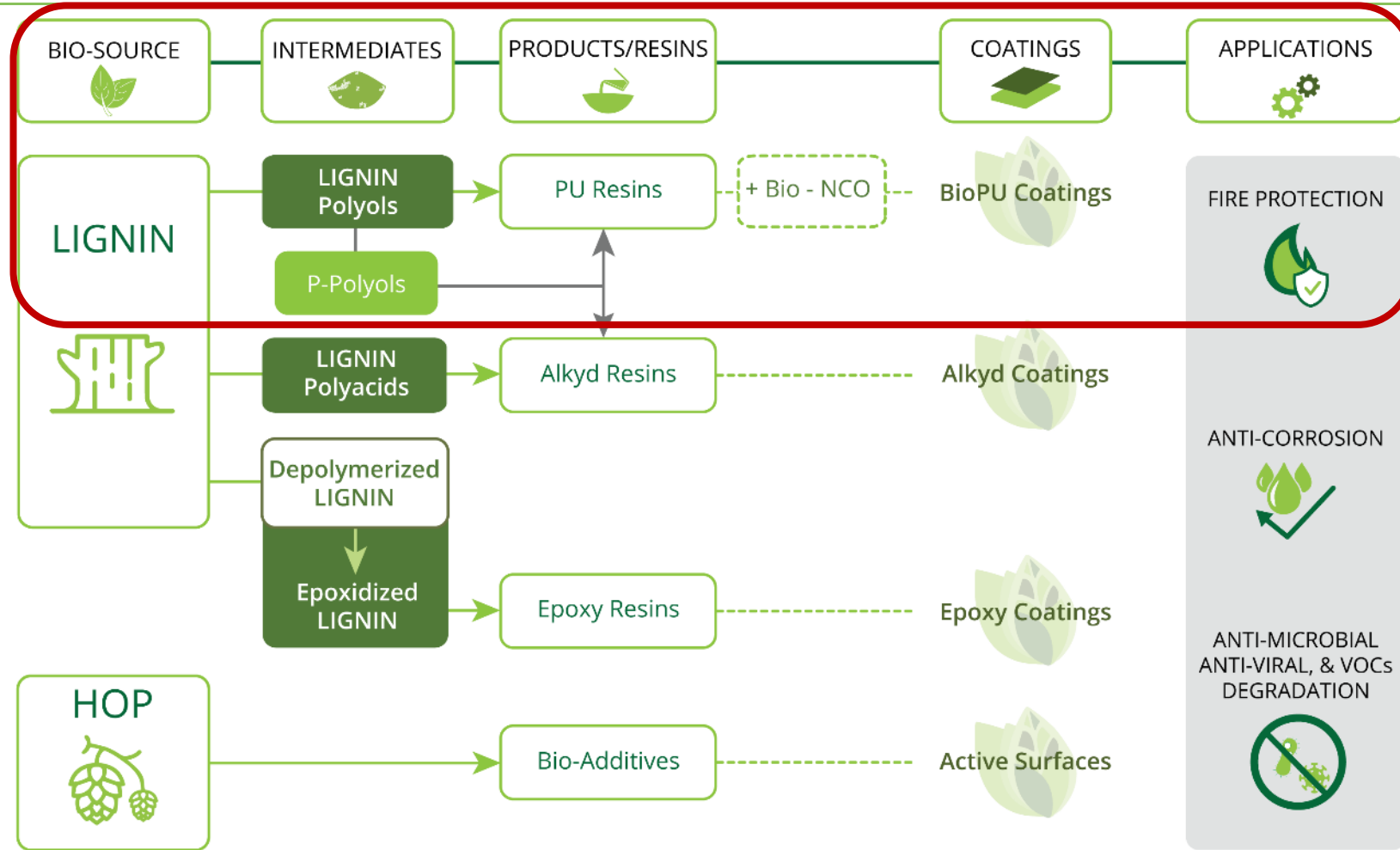
Lignin provides a **sustainable alternative** compared to traditional fossil-based raw materials, as it is obtained from agricultural, forestry, pulp, and paper **industry wastes**.



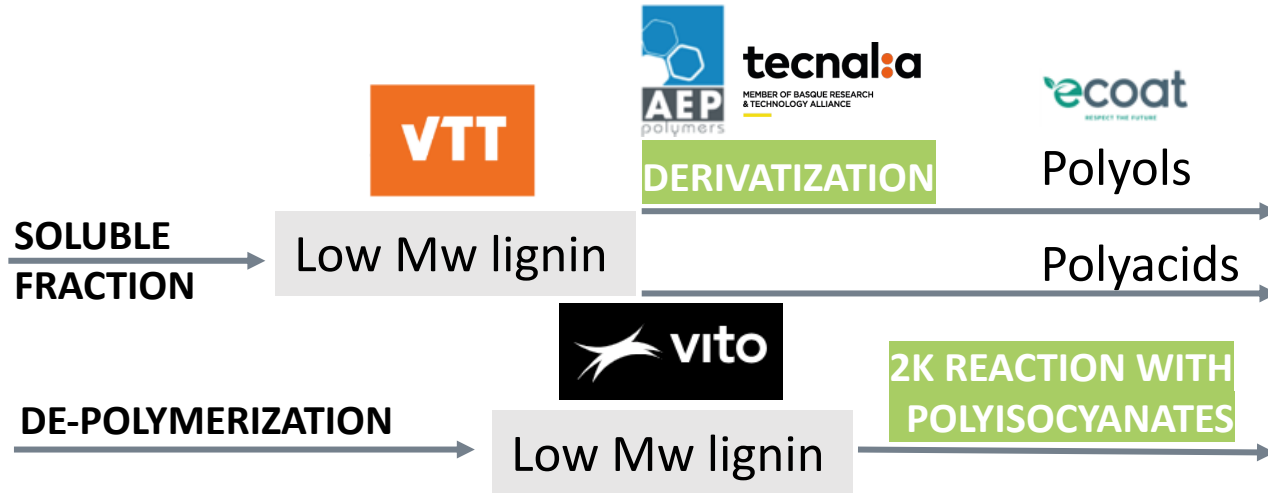
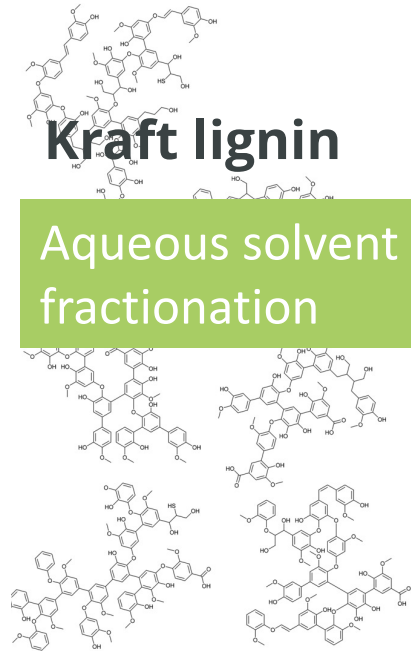
The LIGNICOAT value chain



Given the possibility of obtaining polymers and many products from lignin, it can be used as a building block for producing bio-resins for coatings.



Biocoatings for wood fire protection



Bio-PU clear



FR coatings



Bio-based content of LIGNICOAT coatings up to 60%.



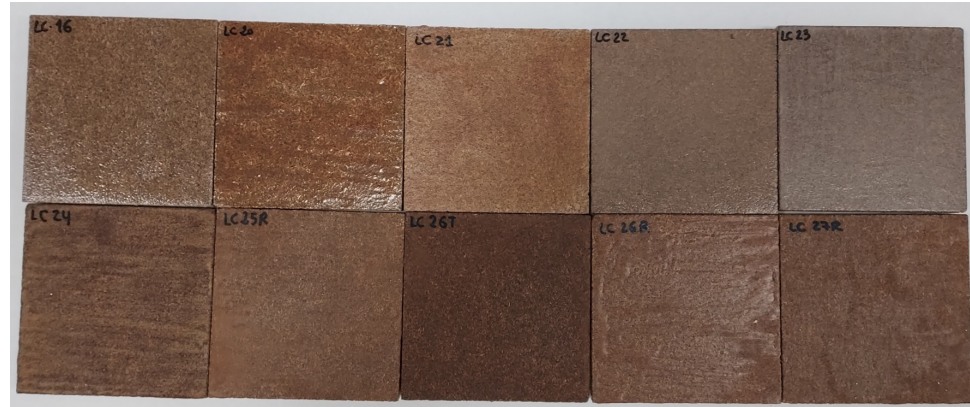
LIGNICOAT applications



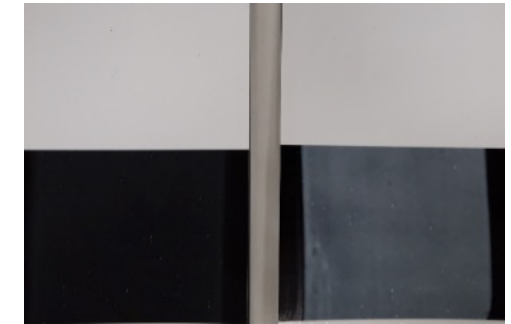
Applied on radiata pine
Evaluation of aspect and colour



Applied on particleboard wood substate
Evaluation of fire performance



Applied on Leneta charts
Evaluation of transparency

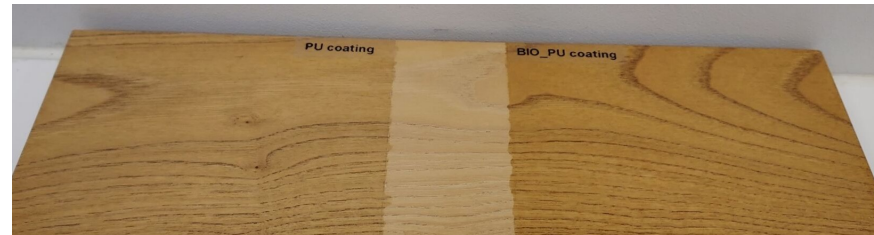


Good transparency



Bad transparency
(Whiteness)
Higher L* values

PU coating



Bio-PU coatings

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Colour and transparency



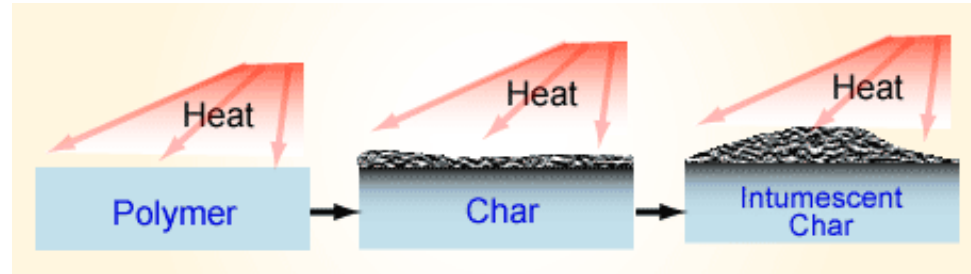
FLAME RETARDANT COATINGS
reaction to fire Bfl-s1 ?



INTUMESCENT COATINGS
reaction to fire B-s1, d0 ?

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Intumescence!



Expansion ratio

42X

46X

26X



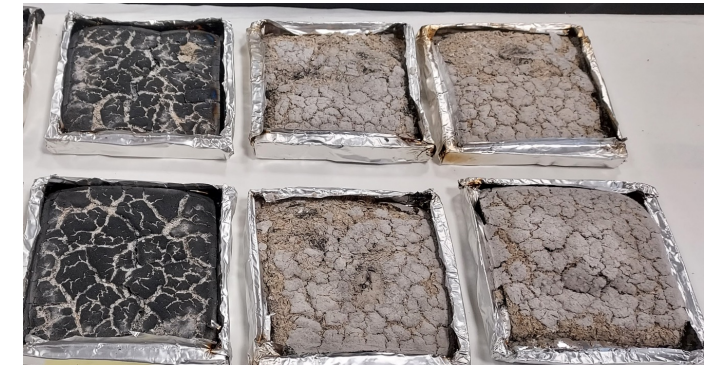
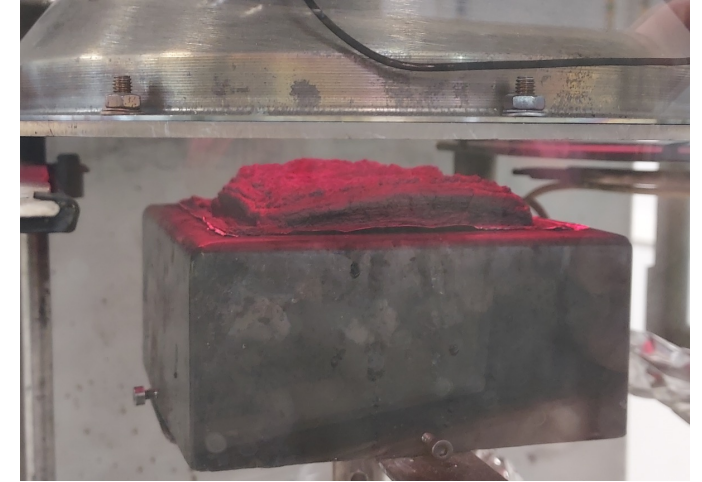
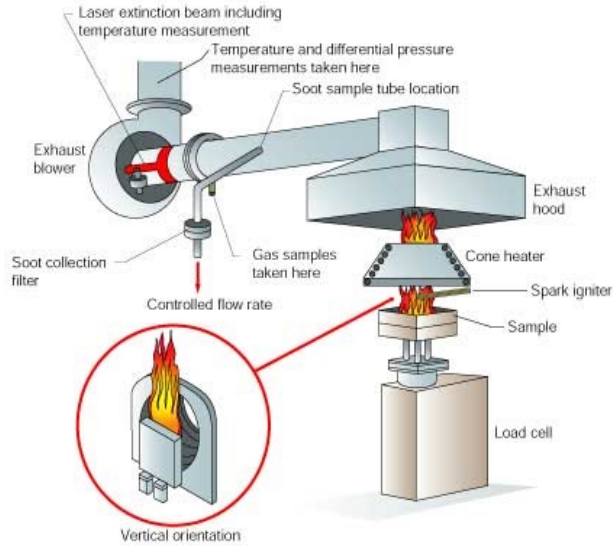
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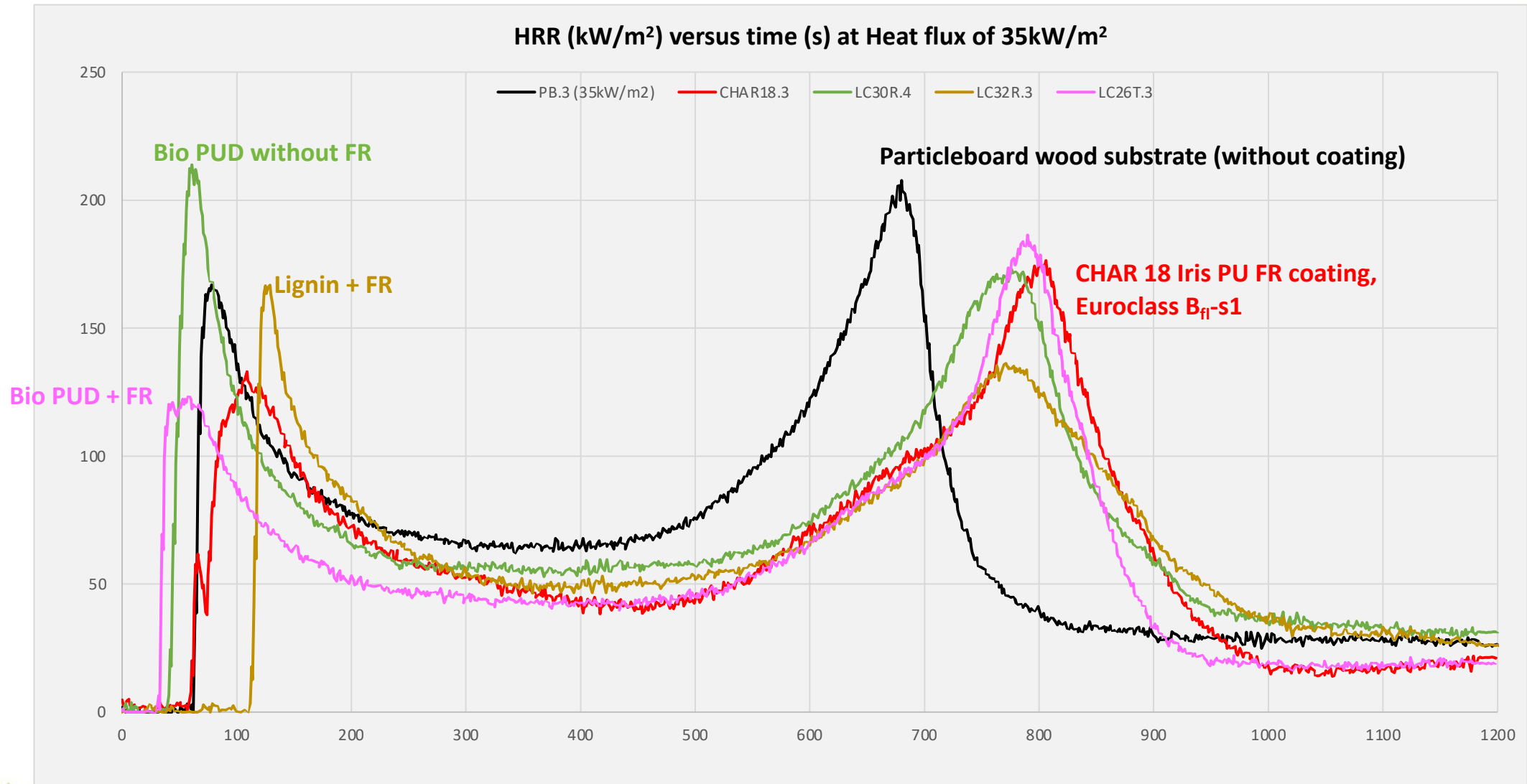
FIRE Performance analysis by Cone calorimeter testing (ISO 5660-2)



- Heat Release Rate (HRR: kW/m²)**
- Average Rate of Heat Release (ARHE, kW/m²),**
- Specific Extinction Area (SEA, m²/kg),**
- smoke production rate (SPR, m²/s)**
- Smoke Opacity (TSP, m²)**
- Time to ignition (TTI, s),**
- Mass loss rate (MLR, g/s),**

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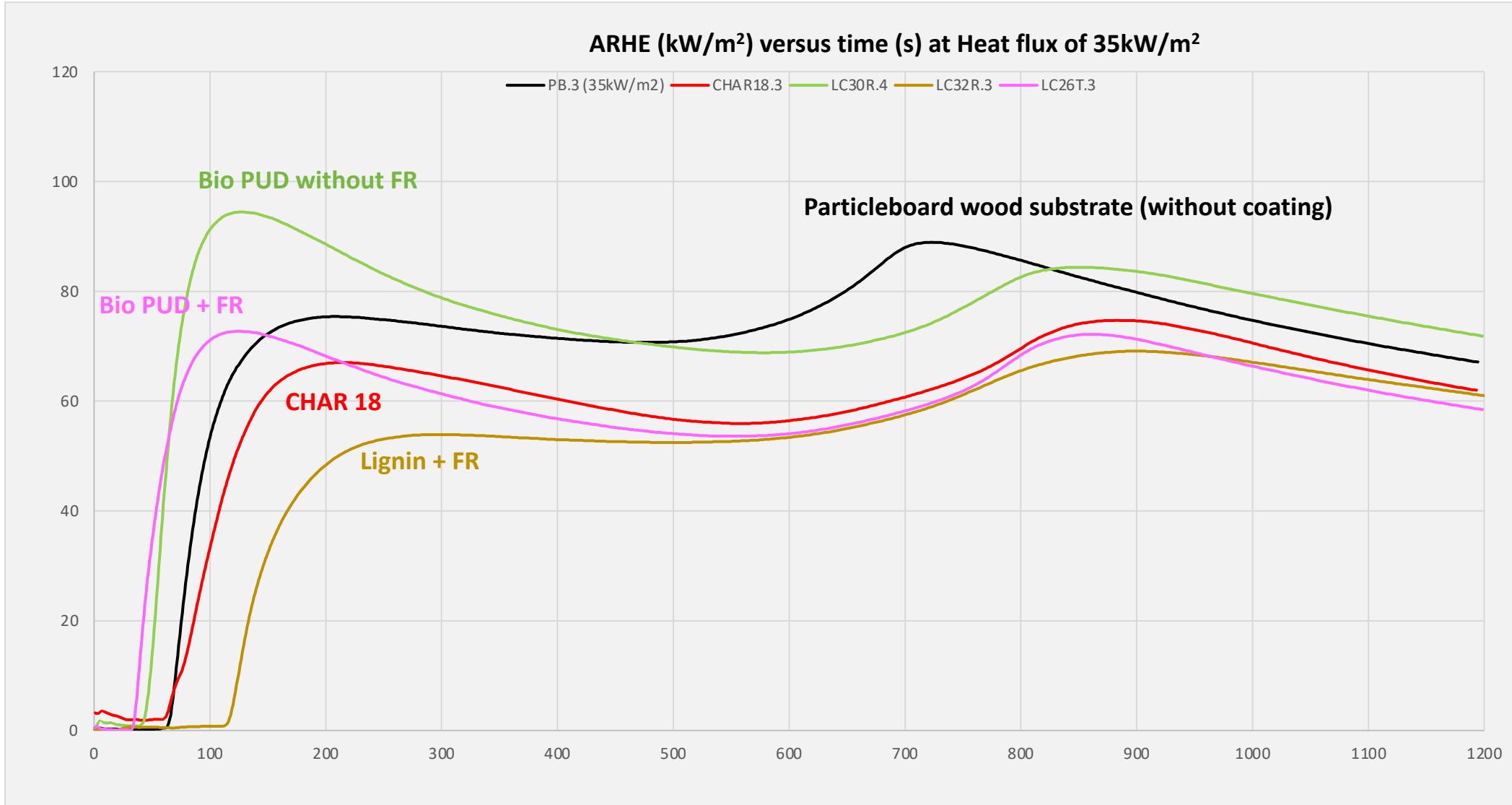
Heat Release Rate, HRR (kW/m²)



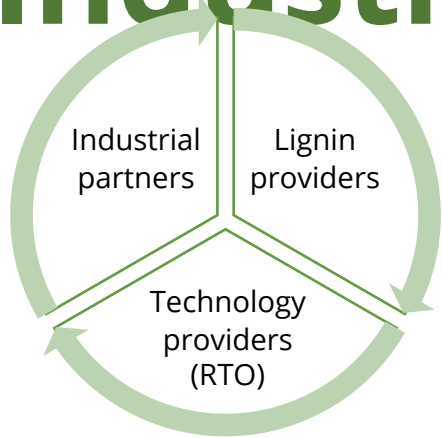
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Average Rate of Heat, ARHE (kW/m²)



Impact Beyond the Coating Industry



A new cross-sector interconnection



New bio-based chemicals (lignin polyols, epoxies, and polyacids) and resins (alkyd, epoxy, polyurethane).



Coating formulations up to 60% bio-based



1 new bio-based value chain



New job opportunities

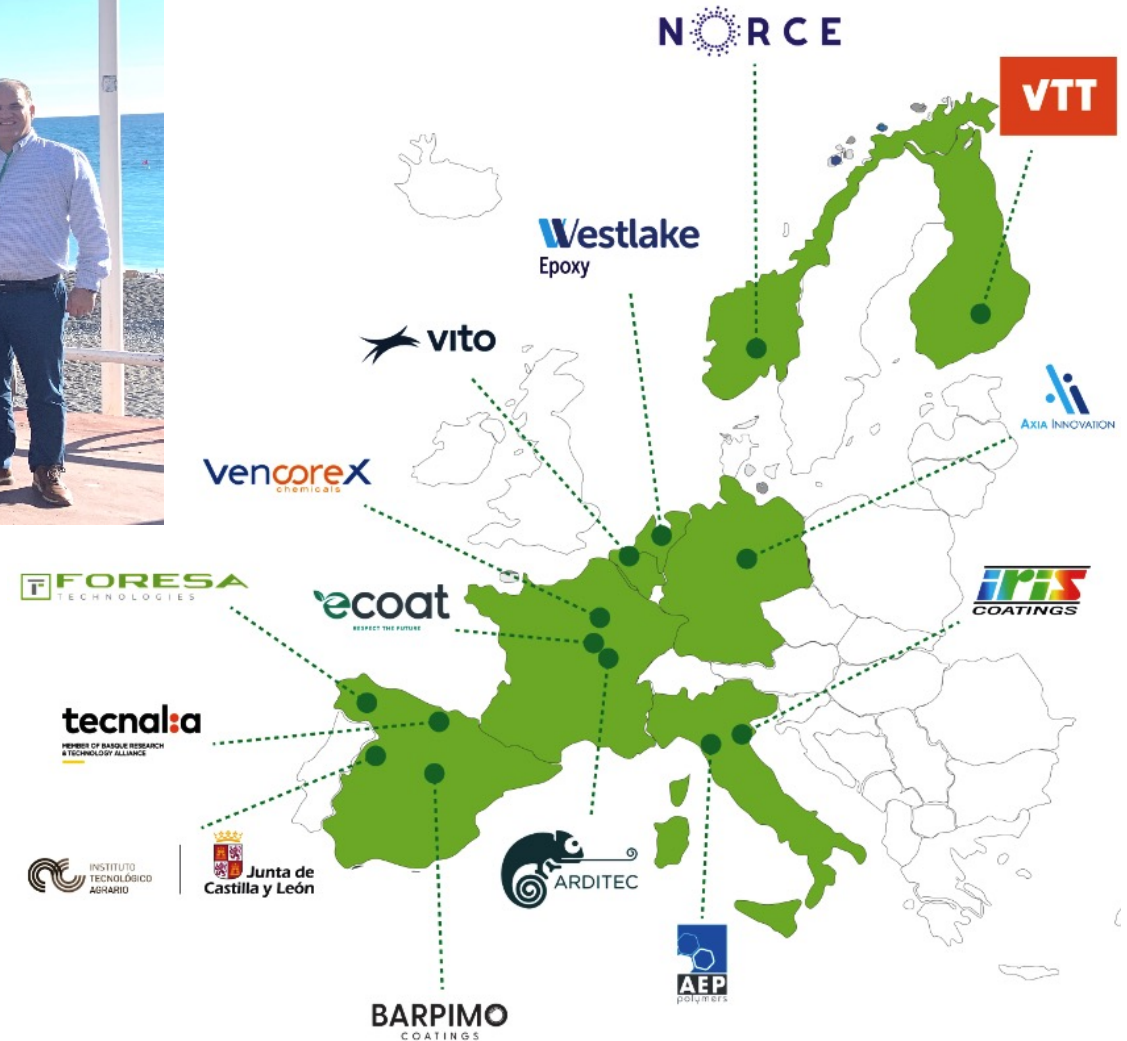


Meet our Team



14 Partners from 8 countries

- 9 Industrials
- 4 RTOs
- 1 Non-profit



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Stay updated and learn more



www.lignicoat.eu



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@LIGNICOATH2020Project



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Thank you

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